Habitat Characterization and Fish Associations in San Juan Channel

Robert Pacunski[1], Don Gunderson[2], Gary Greene[3], and Wayne Palsson[1]

[1]Washington Department of Fish and Wildlife
16018 Mill Creek Blvd.
Mill Creek, WA 98012

[2]School of Fisheries and Aquatic Sciences
University of Washington
Seattle, WA 98195-5020

[3]Center for Habitat Studies
7544 Sandholdt Rd.
California State University at Monterey Bay
Moss Landing, CA 95039

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An ROV survey was conducted in October 2004 among different sub-tidal habitats in San Juan Channel to test the null hypothesis that rockfish, lingcod, and other marine fish are distributed independently of habitat type, geographic location, depth, and reserve status. San Juan Channel was mapped with a high-resolution multi-beam echosounder that collected bathymetric and backscatter information. Based on Greene et al. (1999), twenty-six discrete geomorphologic bedforms were identified from the backscatter bathymetry data, which were condensed into four generalized fish habitat strata: Soft, Coarse, Complex Bedrock, and Smooth Bedrock. The study area was further stratified into North and South regions and shallow (0 – 40 m) and deep (> 40 m) zones. Within the North region only, Complex Bedrock and Smooth Bedrock habitats were sub-stratified by reserve status (fished vs. non-fished).

Random ROV starting locations were generated in ArcGIS 8.3 for the twenty-four identified strata. With the exception of the South, Deep, Smooth stratum, the ROV was deployed a minimum of three times within each stratum, and piloted along the bottom in a direction to allow consistent forward progress. Transects lengths ranged from 0.12 nm to 0.25 nm, dependent upon the size of the stratum and the local current conditions.

A Deep Ocean Engineering Phantom HD2+2 ROV equipped with a high-resolution color zoom camera was used to conduct the survey. An Accusonics TrackPoint II USBL system linked to a laptop computer running Hypack Max Survey software provided geo-referenced locations of the ROV. Parallel lasers mounted on the camera allowed for the width of transect paths to be measured. At depths greater than 30 m the ROV umbilical was tethered to a 200 kg clump weight to minimize stress on the umbilical and provide increased maneuverability of the ROV. At depths less than 30 m, the clump weight was not used.

Fifty-eight transects were completed and approximately 30 hours of videotape collected. Fish densities were calculated by counting the number of fish observed and dividing the count by the transect area. Rockfishes and lingcod were almost exclusively distributed on Complex Bedrock habitats in both northern and southern San Juan Channel. Soft stratum habitats were devoid of rockfish, and only one juvenile lingcod was seen in the Soft stratum. The most commonly encountered species of rockfish were Puget Sound rockfish, followed by copper and quillback rockfish. Other rockfishes observed included tiger, yellowtail, brown, and vermillion rockfish. Kelp greenling showed a broader habitat usage, although densities were highest in complex habitats. Rockfish, lingcod, and kelp greenling were not observed in Coarse stratum habitats. The Smooth Bedrock classification was not consistent with the observed habitat, ranging from coarse cobble-pebble sediments to complex fractured bedrock.

Literature Cited:

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